Natural history data for the canopy-dwelling purpletufts *Iodopleura* (Cotingidae), and first documentation of Dusky Purpletuft *I. fusca* for Brazil

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Purpletufts *Iodopleura* Lesson, 1839, belong to the exclusively Neotropical family, Cotingidae, which includes some of the most diverse, colourful and spectacular passerines in South America, if not the world. However, as currently recognised, the family comprises diverse genera that are only dubiously included within it. The extreme diversity in form, plumage and behaviour suggests that Cotingidae has become a 'dumping ground' for several unrelated lineages with tyrannoid ancestors (Snow 2004). Initially, Sibley & Ahlquist (1990) postulated that the genera *Tityra*, *Schiffornis* and *Pachyramphus* form a distinct group, which they considered to be most closely related to the Tyrannidae, and which became known as the Schiffornis group. By the start of the next decade, work by Prum *et al.* (2000) wrought a change, with the result that genera *Tityra* through *Phibalura* were placed tentatively in Cotingidae. However, further genetic studies (Irestedt *et al.* 2002, Chesser 2004) have confirmed that the genera *Tityra* through at least *Pachyramphus* form a monophyletic group, which Chesser (2004) considered to be more closely related to manakins (Pipridae) than to cotingas. In consequence, many authors now treat *Tityra*, *Schiffornis*, *Laniocera*, *Iodopleura*, *Laniisoma*, *Xenopsaris*, *Pachyramphus* and *Piprites* as Incertae Sedis.

The genus *Iodopleura* occurs only east of the Andes where it is represented by three allopatric canopy species, Dusky Purpletuft *I. fusca*, White-browed Purpletuft *I. isabellae* and Buff-throated Purpletuft *I. pipra*. Their English name derives from the males' long silky and glossy, purple to lilac upper-flank (pectoral) tufts, which are white or absent in females.

I. isabellae is the best known and most widespread of the genus, being fairly common over much of Amazonia, from the west of the basin and upper río Orinoco drainage in southern Venezuela, south-east Colombia, eastern Ecuador and eastern Peru to extreme northern Bolivia (Pando) and Brazil (east to Pará and Maranhão) (Sick 1993, Snow 2004). *I. fusca* replaces *I. isabellae* in the Guianan Shield, over east and south-east Venezuela, the Guianas and adjacent northern Brazil, in Roraima and Amapá, and probably south to the Manaus area (Snow 2004). These two species inhabit *terra firme* forest whilst *I. pipra* is restricted to the Atlantic Forest of eastern Brazil and is globally threatened (BirdLife International 2004), with nominate *I. p. pipra* ranging from Espírito Santo south to São Paulo, whilst *I. p. leucopygia* occurs in north-east Brazil, from Paraíba and Pernambuco to Bahia (Snow 2004).

Dusky Purpletuft *Iodopleura fusca*

First documented Brazilian record.—During field work on 11 June 2000, AW located three *I. fusca c.*11 km north of Presidente Figueiredo, at Iracema Falls, Amazonas, Brazil (02°58'S, 60°02'W). Observations were made using 10×40 binoculars and a 35–60× telescope in excellent light, from a dirt road bisecting the forest. The purpletufts, as is typical of the genus, were perched at 35–40 m in the crown of a tall emergent legume, in primary *terra firme* forest. The birds uttered a thin but shrill repeated *seeee* which AW tape-recorded, and is similar to *I. isabellae* calls (AW pers. obs.). This tape-recording represents the first documentation for *I. fusca* in Brazil and is archived at both the Arquivo Sonoro Elias P.

Coelho (ASEC), Universidade Federal do Rio Janeiro, Brazil, and at the British Library National Sound Archive (BLNS), London, UK.

Records from Amazonas state.—The first Brazilian records of *I. fusca* involved a series of sightings *c.*80 km north of Manaus at the Biological Dynamics of Forest Fragments Project (BDFFP) in December 1984 (Stotz & Bierregaard 1989). In April 1985, Willis & Oniki (1988a) reported sightings of *I. isabellae* at Balbina, 130 km north-northeast of Manaus, but these almost certainly refer to *I. fusca* (pers. obs.). Subsequently, in 1987, AW and M. Cohn-Haft observed *I. fusca* at the same BDFFP reserve (see Cohn-Haft *et al.* 1997), in virgin *terra firme*; one pair, possibly two, on six dates between 20 October and 6 November, whilst on 21 August 2005, GMK located 1–2 birds. All these records are from the same general area as those made by Stotz & Bierregaard (1989). The BDFFP records, at 02°20'S, appear to represent the southernmost range limit of *I. fusca*.

Status.—The Iracema records represent the rediscovery of *I. fusca* north of Manaus, following the initial reports in the 1980s. Despite extensive field work by multiple competent ornithologists in 1988–2000, in pristine purpletuft habitat in *terra firme* north of Manaus (where three canopy towers are located), no field records were made. Furthermore, research into the canopy avifauna by Naka (2004) from these towers (117 hours at each one) also failed to produce any sightings, strongly suggesting that the species is a rare resident that is patchily and very locally distributed in the Manaus region. Nonetheless, the species' tiny size, canopy habitat and simple voice combine to make the birds difficult to detect. Further north (towards the centre of its distribution), we speculate that *I. fusca* may be more common and widespread than present knowledge suggests. For example, in Bolívar, southeast Venezuela, during two visits to *terra firme c.*20 km west of Santa Elena de Uairén, AW located two pairs of *I. fusca* on 2 April 2003 and 13 February 2004, on which date he tape-recorded a pair. The tape-recording appears to represent only the second confirmed Venezuelan record, following two specimens from a single locality in southern Bolívar (Hilty 2003), and is archived at BLNS. Presently, the species is considered uncommon to rare (Snow 2004), from a sparse number of field records and few specimens. Ridgely & Tudor (1994) suggested that *I. fusca* is less rare in French Guiana than elsewhere, as Tostain *et al.* (1992) reported numerous sightings from that country and J. Ingels (*in litt.* 2007) confirms, for instance, that it is seen regularly around the village of Saül, in the interior of the country.

Altitudinal range.—AW's Bolívar observations at *c.*900 m increase the known altitudinal range of *I. fusca* by some 400 m (Hilty 2003, Snow 2004).

Plumage details.—Prolonged studies of the three *I. fusca* at Iracema permitted AW to note the following plumage variation. Two of the three were males, with striking purple upper-flank tufts, clearly visible through the telescope as a purple triangle on the sides of the upper breast at the wing-bend. Although AW had previously searched very carefully for this field mark during all previous field encounters with *I. fusca* (many under excellent conditions), he had failed to observe this feature using binoculars. One of the males was more boldly marked below, with heavier horizontal flanks barring and more pronounced scaling on the upper breast. The female was noted to be overall slightly duller than the other two birds. *I. fusca* is not known to be sexually dimorphic, except in the lack of pectoral tufts, and this individual was perhaps an immature or its plumage had faded. Juveniles, however, have been reported to have conspicuously white-tipped feathers (Snow 2004). On 26 September 2006 whilst closely observing a female through the telescope, AW noticed a distinct symmetrical white throat stripe (*c.*0.5 cm wide and 1 cm long) from the bill base and an indistinct small white smudge in front of the eyes. Careful comparison of specimens may

shed light on any subtle sexual, individual or age-related plumage differences in the species, though no such is obvious in the seven specimens (three male, one of which is perhaps young, and four female) from British Guiana held at The Natural History Museum (Tring, UK) or those two (one male and one female) from Venezuela at the Colección Ornitología Phelps, Caracas (GMK pers. obs.).

Feeding behaviour.—*I. fusca* were observed by AW sallying for flying insects from tree crowns using both vertical and horizontal upward-looping sally-flights of mostly 10–15 m, usually returning to the same perch or the same tree crown. Very similar foraging behaviour exists in Swallow-wing *Chelidoptera tenebrosa*, but the latter species' sally-flights are frequently much longer and they occasionally visit the ground (AW pers. obs.). Purpletufts look very much like miniature Swallow-wings, especially when sallying, having similar (but much smaller) rather broad wings which are noticeable when gliding back to the perch. One *I. fusca* caught a *c*.1-cm moth after a successful upward sally which ended in the bird returning to the same dead canopy snag, where the prey was consumed. On 27 September 2006, at 17.40 h, a female was observed repeatedly sallying to catch *c*.1-cm winged termites (*Isoptera*) or *Hymenoptera* at a hatching event. The longest observed was a *c*.25 m vertical sally ending in an upward swoop to catch the insect, before landing in a nearby tree crown.

Roosting behaviour.—On 11 June 2000, at 17.50 h, AW observed three *I. fusca* at Iracema going to roost in the crown of the legume where he originally discovered them. They were using the topmost, exposed and mostly bare branches at *c*.35–45 m, perching 0.5, 1.0 and 4.5 m apart. The tree offered little or no protection against the elements, as the twigs held only a few tiny leaves and some dried black seedpods. They perched motionless *c*.1 m from the top of the tree, very erect, like miniature *Chelidoptera tenebrosa*, with their tails held vertically down. On subsequent visits at dusk, in August 2000, 2001, 2003, June and August 2005 and September 2006, AW encountered presumably the same 2–3 birds on the same tree crown on four occasions, confirming that they used the same tree for roosting over at least six years.

Voice.—At 17.45 h on 12 August 2005 AW tape-recorded three *I. fusca* chasing each other in the canopy, prior to roosting, uttering a more complex vocalisation that is possibly the song. It comprised a series of five short 'jingly trills' uttered over a five-second period and repeated after 22 seconds. Unfortunately, he was unable to determine if any of the birds were displaying due to the poor angle and brief views. This call is included on a commercially available CD (Stouffer *et al*. 2007) and is very similar to the display-song of *I. isabellae* on Marantz & Zimmer (2006), which AW has also tape-recorded along the río Napo, dpto. Loreto, Peru, and near Parque Indígena do Xingu, Mato Grosso, Brazil.

White-browed Purpletuft *Iodopleura isabellae*

Nesting.—On 21 January 2001, from a canopy platform in *terra firme* at Loreto, Peru, AW observed a group of three *I. isabellae*, of which at least two, presumably a pair, were nest building. A 20–60× telescope permitted exceptional studies of their behaviour. We follow Simon & Pacheco's (2005) standardisation of nest descriptions for Neotropical birds. The nest was being constructing in the canopy of an open-crowned legume, sparsely foliated with tiny compound leaves, and *c*.30–35 m tall. The nest was 4–5 m from the tree's top on a small open, almost horizontal branch, apparently with a small knot hole, where the low cup/base nest was placed, saddling the branch 1 m from the tip, and looking somewhat like a hummingbird nest. Within 30 cm of the nest were five 5–7 cm black bean pods, a feature we have also noted at nests of *I. pipra* in São Paulo and Rio de Janeiro states (AW & GMK

pers. obs.). The three birds repeatedly flew to the nest tree, where one bird (possibly a youngster from the previous nesting) would perch within *c.*1 m of the nest, and the pair undertook their construction work. They repeatedly brought cobwebs in their bills, taking it in turn to land on top of the nest, then carefully rotating in a clockwise direction, slowly 'padding' with their feet whilst carefully placing the cobwebs in the shallow cup edge with their bills. Several times, AW observed both birds, especially the larger (presumably the male), defecating on the side of the nest then working the excrement into the nest with the bill. Once some sticky substance was seen in the bill of one bird; after landing on the nest it wiped its bill multiple times, working this also into the side of the nest. This substance may have been regurgitated sticky seeds, e.g. mistletoe (Loranthaceae), which is regularly taken by *Iodopleura* (Snow 1982, 2004, Sick 1993), and may well help to 'cement' the nest. AW observed similar behaviour from Yellow-crowned Tyrannulets *Tyrannulus elatus* nest building in the canopy of an emergent in *terra firme* at Manaus, using their bills whilst in the nest to cement multiple yellow mistletoe seeds with either its own saliva or the natural sticky pulp of the seeds, by 'gluing' them to the nest rim (AW pers. obs.).

Very similar behaviour was reported at the only other documented nest of *I. isabellae* (Sick 1979), in Pará, Brazil, where, in November 1977, a pair was observed constructing a nest, a thin pad of spider's webs on a slender horizontal branch. A third bird kept company but showed no interest in the construction. Two weeks later the nest appeared finished but no eggs had been laid; it was attached saddle-like and appeared like a cup-shaped hummingbird's nest, measuring 3.0 × 3.4 cm, its depth barely 1 cm. Outside, it was coated so thickly with cobwebs that the underlying materials were invisible; the smooth surface resembled papier-mâché. Sick suggested that saliva might have been used to mat the cobwebs together. AW's observations confirm the suspicion that purpletufts do use other substances, e.g. excrement, to help 'cement' the nest. The only other breeding data involve a stub-tailed fledgling observed on 20 November near Belém (Sick 1979), a female with active ovaries taken on 5 October in Amazonas, Brazil (specimen in the Museu Nacional, Rio de Janeiro), three males from south-east Colombia that were in breeding condition in August–September (specimens in Colección Ornitología Phelps, Caracas), and an unpublished observation (by J. Thompson and C. J. Sharpe) of a nest-building pair at a forest border, at Junglaven, Amazonas, Venezuela, on 12 March 2004.

Display.—During the nest-building observations, AW witnessed apparently the first documented display by any purpletuft in the field, from a male *I. isabellae*. After *c.*15 minutes observing the three purpletufts at the nest, two more birds approached, whereupon immediately one of the three chased the new arrivals, pursuing them through the treetops and away from the nest. Upon returning to the nest, it landed atop a nearby tree and engaged in a spectacular display, transforming itself by flaring its long, intense purple, upper-flank feathers over two-thirds of the breast, leaving only a small white centre. The purple feathers even curled around over the bird's nape, forming a purple-collared effect in side view. This impressive display was emphasised by the sunlight, as the bird remained perched for *c.*30 seconds in the tree crown before flying off.

We predict that males of both *I. fusca* and *I. pipra* use their long colourful, modified upper-flank feathers in a similar manner, in an as yet undescribed courtship display. It is also unknown if the shorter white flank-feathers of female purpletufts possess any function in courtship. Snow (1982) noted a male *I. pipra*, obtained alive, raising and spreading the violet flank feathers when aroused; when calm they were half-covered by the dark breast feathers. Snow further suggested that doubtless these modified feathers are used by the males in courtship, without offering details.

Buff-throated Purpletuft *Iodopleura pipra*

Plumage variation.—*I. pipra* comprises two subspecies: *leucopygia* differs from nominate *pipra* in having a broad white rump band and the buff throat purer (less suffused grey) and more extensive (Snow 1982, 2004).

Nesting.—Previous breeding records of nominate *I. pipra* have all been from lowland São Paulo in late winter (Willis & Oniki 1988b), with a lone spring (October) record (Collar *et al.* 1992). AW and K. J. Zimmer found two nests of nominate *I. pipra* at Fazenda Capricórnio, Ubatuba, São Paulo. On 14 October 1994 they located a nest in a 20-m leafless legume within a shaded active cacao plantation, adjacent to virgin Atlantic Forest. The nest was *c.*15 m up and near the centre of the tree. The easily overlooked nest was a low cup/fork (see Fig. 2d in Simon & Pacheco 2005), hugging an almost horizontal branch in a gentle depression where three smaller, almost horizontal branches forked. It contained a three-quarters grown, partially feathered nestling which was being fed by at least two adults every few minutes. Adults were seen regurgitating small white berries near the nest. Some 200 m away, we encountered three more purpletufts, two of which were chasing each other in the canopy of a leafless 30-m tall tree with much wing- and tail-quivering. One engaged in highly exaggerated wing-lifting, holding the wings in a 'V'. These observations may have been of a recently fledged youngster food-begging.

On 15 October 1995, along the entrance road to Fazenda Capricórnio, while observing a perched purpletuft through a 30× telescope during a rainstorm, AW noticed that the bird was brooding, as the bill of a single nestling was just visible amongst the brooding adult's breast-feathers. The nest was so small and the brooding adult so erect as to make the nest practically invisible. Willis & Oniki (1988b) also noted that nestlings of *I. pipra* perfectly imitate the nest colour. This nest was *c.*17 m up in a bare legume, locally called 'farinha seca' and was also a tiny low cup/fork nest where four horizontal branches radiated. The nest was 1.5 m from the main trunk. Again, a second bird was noted perching motionless *c.*0.5 m above the nest for 3–4 minutes.

On 22 October 1998, near Mambucaba / Perequê, Rio de Janeiro, GMK was shown an abandoned nest (active a week or so earlier) in a *Cecropia* (*c.*10 m tall), on one of the pair of topmost horizontal branches. The nest was positioned close to the end of the branch and was highly inconspicuous, looking almost like a bump on the bark, being scarcely a couple of cm high. On 21 September 2007, at Fazenda Angelim, Ubatuba, GMK observed two nests of *I. pipra*, at the edges of a clearing surrounded by an abandoned shade cacao plantation, situated *c.*400 m apart. The first nest was under construction, apparently solely by the female, though the male 'stood sentinel' and occasionally expanded the pectoral tufts as his mate collected nest material. It was sited at *c.*10 m above ground in a central two-way fork within 2–3 m of the crown of a near-leafless legume. The female collected fresh lichens from within 2 m of the ground in nearby trees. Subsequently, on 19 October 2007, the female was observed at the nest, apparently incubating, several times during the day which was overcast with periodic rain showers, sometimes heavy. The male occasionally perched close by. The second nest, sited *c.*20 m above ground, also in a two-way fork, close to the topmost branches of another leafless legume, already contained a single, several-day-old young, being brooded by the adult female. The male again remained close by and both adults were observed to agressively chase a Rufous-bellied Thrush *Turdus rufiventris* which approached to within 1 m of the nest. However, a Green-headed Tanager *Tangara seledon* that perched a similar distance from the nest was not subject to such attention (see also Agonistic behaviour). On 19 October only the single young, by now adult-sized and similarly plumaged, but still perched on the nest was present. The nest tree was by this time in leaf.

GMK has also observed different incubating birds at Fazenda Angelim, Ubatuba, in October 2000 and August 2002. These nests matched the descriptions given above.

Previous published nesting records for nominate *I. pipra* involve two (tiny cup) nests near Ubatuba, 20–25 m high in tall leafless leguminous trees, each with one young, on 10 August 1986; the nests were within 70 m of each other (Willis & Oniki 1988b). A three-quarters-grown chick was noted near Ubatuba, on 11 October 1991, in a nest 12 m above ground in a bare tree within an overgrown cacao plantation (Collar *et al.* 1992). The only known breeding datum for *I. p. leucopygia* comes from the highlands of Serra Branca, Murici, Alagoas, where on 10 May 1984 a nesting pair (originally ascribed to *I. isabellae*) was observed and the nest collected (Teixeira *et al.* 1987). The nest was positively compared with the description of Sick (1979) for that of *I. isabellae*, causing the initial misidentification to species, which the authors later corrected (Teixeira *et al.* 1990). We have also seen the photograph of another nest (posted at www.surfbirds.com), taken on 10 August 2005, by N. Athanas, which contained a downy young obviously at least several days old.

Agonistic behaviour.—Approximately 30 cm below the *I. pipra* nest found on 14 October 1994, a pair of Crested Becards *Pachyramphus validus* was constructing a typical closed/globular nest of moss attached to a fork. One of the purpletufts remained perched in the same tree and *c.*5 m from the nest for five minutes. Almost every time the much larger becards (mostly the female) approached their nest with nesting material, the smaller purpletufts attempted to chase them off. Two days later, AW observed a pair of *Iodopleura* atop a legume chasing a Sayaca Tanager *Thraupis sayaca* within an overgrown cacao plantation, *c.*1 km from the active nest.

Feeding behaviour.—AW has observed *I. pipra* at Ubatuba to engage in 2–5 m circular sallies for insects within the crown of a nesting legume. At Boa Nova, Bahia, on 2 February 1999, AW observed a lone *I. p. leucopygia* foraging from the top of a *c.*15 m legume at the edge of a corridor of Atlantic Forest. The behaviour was very reminiscent of *I. fusca* and *Chelidoptera tenebrosa*, involving three *c.*10–15 m looping upward sallies to catch unidentified flying insects before returning to the same perch. We have numerous observations of perch-gleaning for mistletoe in clumps on larger trees, as well as taking small yellowish berries from a vine in the subcanopy.

Mobbing behaviour.—During field work in remnant Atlantic Forest at Boa Nova, Bahia, AW and K. J. Zimmer noted that *I. p. leucopygia* is readily located using either playback or by imitating the song of Brazilian Pygmy-owl *Glaucidium minutissimum* at forest edges with a clear view of the canopy. Purpletufts often approach to investigate an owl mobbing scene, perching in the tree crowns agitatedly giving a thin two-syllable whistle whilst raising the somewhat elongated crown-feathers. This method may prove useful to field workers seeking this species, which is easily overlooked, and it might also be considered by ornithologists in south-east Brazil searching for the Critically Endangered Kinglet Calyptura *Calyptura cristata*, whose voice is still unknown (Pacheco & Fonseca 2001) and is reminiscent of a miniature purpletuft in size.

Altitudinal movements.—Breeding in coastal lowlands during winter and spring, *I. pipra* has been suggested to undertake altitudinal movements to higher elevations during the summer, based principally on the observation of small flocks 'migrating' at 900 m in Espírito Santo, in November (Sick 1993). In the north-east Atlantic Forest, however, it would seem probable that subspecies *leucopygia* is resident at highland localities based on available data (Teixeira *et al.* 1987, 1990, Collar *et al.* 1992; AW pers. obs., GMK pers. obs., E. Endrigo & L. F. Silveira *in litt.* 2006), especially given the almost total loss of lowland forest in this region

of Brazil, except in Bahia where some important remnants remain. Even in the range of nominate *pipra*, multiple recent observations in the lowlands of São Paulo, at Ubatuba, are available from all months, except June (GMK pers. obs., E. Endrigo, L. F. Silveira, C. Rizzo & J. Minns *in litt.* 2006), only records below 500 m are available from the environs of Parati, in nearby Rio de Janeiro state (Browne 2005), and there are records from highland localities between São Paulo and Espírito Santo at seasons other than summer (Camargo & Camargo 1964, Collar *et al.* 1992; E. O. Willis *in litt.* 2007), all of which casts some doubt on the migration theory. In this respect, it is perhaps worth noting that a record in the Collar *et al.* volume, that from Macaé de Cima, Rio de Janeiro, cited as being made in May 1986, is actually attributable to 6 March 1986 (J. F. Pacheco *in litt.* 2007). Willis has previously unpublished records from the (highland) Santa Teresa region, Espírito Santo, in early September 1989 and late July 1993. Around Perequê, Rio de Janeiro, R. Parrini (*in litt.* 2006) has records in June, July and November (in addition to the October nest record mentioned above), whilst in the Serra dos Órgãos, in the environs of Teresópolis, the same observer has observed a single at 300 m (12 May 1996), a group of five at 700 m (27 December 1992), with another record at 900 m (date lost). These latter data might tend to support the migration hypothesis, but until more accurate information concerning the species' overall range become available, based on more uniformly distributed observer effort, it might just as well signal that the species is more widespread than generally appreciated.

Conservation.—That *I. pipra* may undertake altitudinal migrations, or perhaps more likely local movements, would have serious consequences for its conservation, as habitat requirements are twice as great as those for sedentary species, and would include both mid-elevation and lowland Atlantic Forest. It is, therefore, extremely important that research focuses on learning more about the movements, if any, of this poorly known bird, as it could be at greater risk than most endemics, particularly due to the loss of lowland Atlantic Forest.

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